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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,732	05/30/2001	Paul Joseph Stewart	200-1452 DBK	3348

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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/681,732	STEWART ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4,5,8-15 and 18-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4,5,8-15 and 18-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 were previously examined.

2. Claims 1-3,6,7,16 and 17 are now cancelled.

3. Claims 4,5,8-15,18-20 were examined.

Section I: Response to Applicants' Arguments (1st Office Action)

35 U.S.C. 112 2nd

4. Applicants are thanked for addressing this issue. Rejection is withdrawn.

35 U.S.C. 102(b)

5. Applicants are thanked for addressing this issue. Rejection is withdrawn.

35 U.S.C. 103(a)

6. Applicants are thanked for addressing this issue. Rejection is withdrawn; however, examiner has discovered new art in light of amended claims.

Section II: Final Rejection (2nd Office Action)

Claim Rejections - 35 USC § 103

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 4, 8-13,14, 18-20 are rejected under 35 U.S.C. 103 (a) as obvious by Hirai et al. (U.S. Patent 5,734, 364 (1998)) in view of Stewart et al. (U.S. Patent 5,903,358 (1999)). Hirai et al. teaches a method of driving a picture display with the use of maximum displacement (column 10, lines 1-3) and reference vectors (column 14, lines 1-4) and other mathematical tools; but doesn't teach applying the latter mathematical tools towards direct surface manipulation (DSM). Stewart et al. teaches an improved direct surface manipulation method is disclosed which incorporates a global surface.

At the time of invention, it would have been obvious to one of ordinary skill in the art to modify Hirai et al. by way of Stewart et al. to improve shape fidelity (Stewart: column 3, line 54).

Claim 4. A method for design of experiments using direct surface manipulation of a mesh model, (Stewart: column 4, lines 34-55) said method comprising the steps of: selecting a geometric model, wherein the model is in a computer-aided design (CAD)

format (Stewart: column 1, lines 5-12); converting the geometric model into a mesh model, (Stewart: column 4, lines 34-55); evaluating the mesh model using a computer-aided engineering (CAE) analysis (Stewart: column 5-12); determining whether to continue generating the design of experiments response (Stewart: column 1, lines 25-34); modifying a surface of the mesh model by varying a predetermined parameter, wherein the surface is modified using direct surface manipulation (DSM), by defining a sketch plane containing a domain of DSM feature, (Stewart: column 2, lines 31-34) positioning the sketch plane relative to the surface of the model, locating a reference center within the domain, (Hirai: column 14, lines 1-4) projecting a vertex located on the surface of the mesh model into the domain of the sketch plane, specifying a maximum displacement (Hirai: column 10, lines 1-3) of the DSM feature by locating a reference vector centered at the reference center to define the height of the DSM feature in object space, specifying a basis function to determining a displacement of the vertex, determining a displacement of the vertex relative to the DSM feature using the basis function, and using the displacement of the vertex to modify the surface of the mesh model, (Stewart: column 11, lines 9-21) the mesh model is updated and the updated mesh model is used in continuing generating the design of experiments response, if determined to continue generating the design of experiments response; and using the results of the CAE analysis for the design of experiments.

Claim 8. A method as set forth in claim 4 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21) including the step of selecting a mesh model stored in a memory of the computer system (Stewart: column 12, line 25).

Claim 9. A method as set forth in claim 4 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21) including the step of separating the surface feature (Stewart: column 34-48) modified using DSM from the mesh model and storing the DSM feature within an electronic database in the memory of the computer system (Stewart: column 12, line 25).

Claim 10. A method as set forth in claim 4(Chen: abstract; Stewart: column 3, lines 31-53) including the step of modifying the deformation of a local area (Stewart: figures 14 and 15 with column 12, 11-25) of the surface by changing a DSM feature parameter.

Claim 11. A method as set forth in claim 4 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21) including the step of refining (Stewart: column 11, lines 35-40) the number of elements of a surface feature modified using DSM.

Claim 12. A method as set forth in claim 8 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21; Stewart: column 12, line 25) wherein said step of selecting a CAD model and converting the CAD model into a mesh model includes the steps of: selecting a base mesh model from an electronic database stored in the memory of the computer system (column 12, lines 21-36) selecting a DSM feature from an electronic database stored in the memory of the computer system; and

generating a mesh model using the base mesh model and the selected DSM feature (Stewart: abstract).

Claim 13. A method as set forth in claim 8(Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21; Stewart: column 12, line 25) wherein said step of selecting a CAD model and converting the CAD model into a mesh model includes the steps of selecting a DSM feature from an electronic database stored in the memory of the computer (Stewart: column 12, lines 21-36) system and generating a mesh model using the converted mesh model and the selected DSM feature (Stewart: abstract).

Claim 14. A method for design of experiments using direct surface manipulation of a mesh model, (Stewart: column 4, lines 34-55) said method comprising the steps of: selecting a base mesh model from an electronic database stored in the memory of the computer system; selecting a DSM feature from an electronic database stored in the memory of the computer system (column 12, lines 21-36); generating a mesh model using the base mesh model and the selected DSM feature; evaluating the mesh model using a computer-aided engineering (CAE) analysis; determining whether to continue generating the design of experiments response (Stewart: column 1, lines 25-34); modifying a surface of the mesh model by varying a predetermined parameter, wherein the surface is modified using direct surface manipulation (DSM) (Stewart: column 2, lines 31-34), by defining a sketch plane containing a domain (Hirai: column 14, lines 1-

4) of DSM feature, positioning the sketch plane relative to the surface of the model, locating a reference center within the domain, projecting a vertex located on the surface of the mesh model into the domain of the sketch plane, specifying a maximum displacement (Hirai: column 10, lines 13-15) of the DSM (Stewart: abstract) feature by locating a reference vector centered at the reference center to define the height of the DSM feature in object space, specifying a basis function to determining a displacement of the vertex, determining a displacement of the vertex relative to the DSM feature using the basis function, and using the displacement of the vertex to modify the surface of the mesh model, (Stewart: column 11, lines 9-21) the mesh model is updated and the updated mesh model is used in continuing generating the design of experiments response, if determined to continue generating the design of experiments response; and using the results of the CAE analysis for the design of experiments response.

Claim 18. A method as set forth in claim 14 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21; Stewart: column 12, line 25) including the step of separating the surface feature modified using DSM from the mesh model and storing the DSM feature within an electronic database in the memory of the computer system (Stewart: column 12, lines 21-36).

Claim 19. A method as set forth in claim 14 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21; Stewart: column 12, line 25)

including the step of modifying the deformation (Stewart: figures 14 and 15 with column 12, 11-25) of a local area of the surface by changing a DSM feature parameter

Claim 20. A method as set forth in claim 14 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21; Stewart: column 12, line 25) including the step of refining (Stewart: column 11, lines 35-40) the number of elements of a surface feature modified using DSM.

10. Claims 5 and 15 are rejected under 35 U.S.C. 103 (a) as obvious by Hirai et al. (U.S. Patent 5,734, 364 (1998)) in view of Stewart et al. (U.S. Patent 5,903,358 (1999)) and in further view of Dehmlow et al (U.S. Patent 5,999,187 (1999)). Hirai et al. teaches a method of driving a picture display with the use of maximum displacement (column 10, lines 1-3) and reference vectors (column 14, lines 1-4) and other mathematical tools; but doesn't teach applying the latter mathematical tools towards direct surface manipulation (DSM) or computation fluid dynamics. Stewart et al. teaches an improved direct surface manipulation method is disclosed which incorporates a global surface while Dehmlow et al. 3-D CAD by bounded volume procedures for, in part, computation fluid dynamics.

At the time of invention, it would have been obvious to one of ordinary skill in the art to modify Hirai et al. by way of Stewart et al. to improve shape fidelity (Stewart: column 3, line 54) at reasonable cost (Dehmlow: column 2, lines 20-21).

Claim 5. A method as set forth in claim 4 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21) wherein said step of evaluating the mesh model using CAE includes using computational fluid dynamics (CFD) (Dehmlow: column 5, lines 40-55 and column 17, line 58-62).

Claim 15. A method as set forth in claim 14 (Stewart: column 4, lines 34-55; Hirai: column 10, lines 1-3; Stewart: column 11, lines 9-21) wherein said step of evaluating the mesh model using CAE includes using computational fluid dynamics (CFD) (Dehmlow: column 5, lines 40-55 and column 17, line 58-62).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Tom Stevens whose telephone number is 571-272-3715, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Leo Picard at (571) 272-3749. Fax number is 571-273-3715.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

June 4, 2005

THS

CW Tavenner
Primary Examiner
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